



Appl. No. 10/757,516

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PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (original) A programmable processor comprising:
 - an instruction path;
 - a data path;
 - an external interface operable to receive data from an external source and communicate the received data over the data path;
 - a register file operable to receive and store data from the data path and communicate the stored data to the data path; and
 - an execution unit coupled to the instruction and data paths and operable to decode and execute instructions received from the instruction path, wherein in response to decoding a single instruction specifying both a mask and a register containing data, the mask comprising fields that each correspond to a field of the data contained in the register, the execution unit is operable to:
 - (i) detect some of the fields of the mask as having a predetermined value and identifying corresponding fields of the data contained in the register as write-enabled data fields; and
 - (ii) cause the write-enabled data fields to be written to a specified memory location.
2. (original) The processor of claim 1 wherein each of the fields of the mask has a width of one bit.
3. (original) The processor of claim 1 wherein each of the fields of the data contained in the register has a width of one bit.
4. (original) The processor of claim 1 wherein the execution unit is operable to cause the write-enabled data fields to be written to the specified memory location by reading an unaltered field of data from the specified memory location and writing the unaltered field of data along with the write-enabled data fields to the specified memory location.

5. (original) The processor of claim 1 wherein the mask is contained in a specified register.

6. (original) The processor of claim 1 wherein the memory location is contained in a specified register.

7. (original) The processor of claim 1 wherein the specified memory location comprises a section of memory having a specific width and beginning at a specific memory address.

8. (original) The processor of claim 1 wherein the predetermined value is a logic 1.

9. (original) The processor of claim 1 wherein the execution unit is further operable to, in response to decoding a second single instruction specifying a third and a fourth register each containing a plurality of operands, multiply the plurality of floating point operands in the third register by the plurality of operands in the fourth register to produce a plurality of products and provide the plurality of products to partitioned fields of a result register as a second catenated result.

10. (original) A data processing system comprising:

(a) a bus coupling components in the data processing system;

(b) an external memory coupled to the bus;

(c) a programmable microprocessor coupled to the bus and capable of operation independent of another host processor, the microprocessor comprising:

an instruction path;

a data path;

an external interface operable to receive data from an external source and communicate the received data over the data path;

a register file operable to receive and store data from the data path and communicate the stored data to the data path; and

an execution unit coupled to the instruction and data paths and operable to decode and execute instructions received from the instruction path, wherein in response to decoding a

single instruction specifying both a mask and a register containing data, the mask comprising fields that each correspond to a field of the data contained in the register, the execution unit is operable to:

- (i) detect some of the fields of the mask as having a predetermined value and identifying corresponding fields of the data contained in the register as write-enabled data fields; and
- (ii) cause the write-enabled data fields to be written to a specified memory location.

11. (original) The system of claim 10 wherein each of the fields of the mask has a width of one bit.

12. (original) The system of claim 10 wherein each of the fields of the data contained in the register has a width of one bit.

13. (original) The system of claim 10 wherein the execution unit is operable to cause the write-enabled data fields to be written to the specified memory location by reading an unaltered field of data from the specified memory location and writing the unaltered field of data along with the write-enabled data fields to the specified memory location.

14. (original) The system of claim 10 wherein the mask is contained in a specified register.

15. (original) The system of claim 10 wherein the memory location is contained in a specified register.

16. (original) The system of claim 10 wherein the specified memory location comprises a section of memory having a specific width and beginning at a specific memory address.

17. (original) The system of claim 10 wherein the predetermined value is a logic 1.

18. (original) The system of claim 10 wherein the execution unit is further operable to, in response to decoding a second single instruction specifying a third and a fourth register each containing a plurality of operands, multiply the plurality of floating point operands in the third register by the plurality of operands in the fourth register to produce a plurality of products and provide the plurality of products to partitioned fields of a result register as a second catenated result.

19. (new) A programmable processor comprising:

- a virtual memory addressing unit;
- an instruction path and a data path;
- an external interface operable to receive data from an external source and communicate the received data over the data path;
- a cache operable to retain data communicated between the external interface and the data path;
- a register file comprising a plurality of registers coupled to the data path; and
- an execution unit, coupled to the instruction and data paths, that is operable to decode and execute instructions received from the instruction path, the execution unit capable of performing a bitwise insert operation that operates on a first and a second operand stored in registers in the register file, wherein for each bit in the first operand, the bitwise insert operation inserts the bit into a corresponding bit position in a destination value if a corresponding bit from the second operand has a first predetermined value.

20. (new) The programmable processor of claim 19 wherein the first predetermined value is a logic 1.

21. (new) The programmable processor of claim 19 wherein for each bit in the first operand, the bitwise insert operation maintains a corresponding bit position in the destination value as unchanged if a corresponding bit in the second operand has a second predetermined value.

22. (new) The programmable processor of claim 21 wherein the second predetermined value is a logic 0.

23. (new) The programmable processor of claim 19 wherein the bitwise insert operation stores the destination value into memory.

24. (new) The programmable processor of claim 19 wherein each of the first and second operands has a width of 64 bits.

25. (new) The programmable processor of claim 19 wherein the execution unit is further capable of executing a plurality of different group floating-point arithmetic operations that arithmetically operate on multiple floating-point operands stored in partitioned fields of an operand register in the plurality of registers to produce a catenated result that is returned to a register in the plurality of registers, wherein the catenated result comprises a plurality of individual floating-point results.

26. (new) A device having installed therein a programmable processor, the programmable processor comprising:

- a virtual memory addressing unit;
- an instruction path and a data path;
- an external interface operable to receive data from an external source and communicate the received data over the data path;
- a cache operable to retain data communicated between the external interface and the data path;
- a register file comprising a plurality of registers coupled to the data path; and
- an execution unit, coupled to the instruction and data paths, that is operable to decode and execute instructions received from the instruction path, the execution unit capable of performing a bitwise insert operation that operates on a first and a second operand stored in registers in the register file, wherein for each bit in the first operand, the bitwise insert operation

inserts the bit into a corresponding bit position in a destination value if a corresponding bit from the second operand has a first predetermined value.

27. (new) The device of claim 26 wherein the first predetermined value is a logic 1.

28. (new) The device of claim 26 wherein for each bit in the first operand, the bitwise insert operation maintains a corresponding bit position in the destination value as unchanged if a corresponding bit in the second operand has a second predetermined value.

29. (new) The device of claim 28 wherein the second predetermined value is a logic 0.

30. (new) The device of claim 26 wherein the bitwise insert operation stores the destination value into memory.

31. (new) The device of claim 26 wherein each of the first and second operands has a width of 64 bits.

32. (new) The device of claim 26 wherein the execution unit is further capable of executing a plurality of different group floating-point arithmetic operations that arithmetically operate on multiple floating-point operands stored in partitioned fields of an operand register in the plurality of registers to produce a catenated result that is returned to a register in the plurality of registers, wherein the catenated result comprises a plurality of individual floating-point results.